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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/754,806	01/02/2001	Q.Z. Liu	00CON122P-DIV1	2716

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EXAMINER	
NADAV, ORI	

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/754,806	LIU ET AL	
	Examiner	Art Unit	
	Ori Nadav	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 February 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24,25,30-44 and 46-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24,25,30-44 and 46-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 24-25, 30-44 and 46-48 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support in the specification for the claimed limitations of said first area of said dielectric, said second area of said dielectric, and said conductor have a same thickness, as recited in claims 24, 31 and 37.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 24-25, 30-44 and 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over El-Sharawy et al. (6,013,939) in view of Forbes et al. (6,287,932) and Applicant's Admitted Prior Art (AAPA).

Regarding claims 24-25, 30-35, 37-44, 46 and 48, El-Sharawy et al. teach in figure 1 and related text a structure in a semiconductor chip, the structure comprising

a second area of dielectric 32 having a second permeability,

a permeability conversion magnetic oxide material 32 having a second permeability, the permeability conversion material 32 being interspersed within the second area of said dielectric, wherein a second permeability being achieved by interspersing a permeability conversion material (metal particles) within the second area of the dielectric, the permeability conversion material having a third permeability, the third permeability being greater than the first and second permeabilities,

a conductor 38 patterned in said second area of the dielectric, said permeability conversion material not being situated underneath the conductor,

wherein said dielectric is not situated underneath and not situated over the conductor,

wherein said permeability conversion material is selected from the group consisting of nickel, iron, nickel-iron alloy and magnetic oxide (column 4, lines 35-39),

wherein said permeability conversion material is interspersed in said second area of said dielectric,

and wherein the conductor having first and second terminals, the first and second terminals of the conductor being respectively first and second terminals of the inductor.

El-Sharawy et al. do not teach a conductor selected from the group consisting of copper, aluminum and copper-aluminum alloy, and a first area of low-k dielectric having a first permeability, wherein the second permeability is higher than the first permeability, wherein said first area of said dielectric is not situated underneath said second area of said dielectric and not situated over said second area of said dielectric, wherein

first area of said dielectric, said second area of said dielectric, and said conductor have a same thickness.

El-Sharawy et al. teach conductors 28, 40 selected from the group consisting of copper, aluminum and copper-aluminum alloy (column 4, lines 6-9).

Forbes et al. teach in figure 2 and related text a first area of dielectric (the white area located above device 210 and surrounding inductor 210) having a first permeability, wherein said first area of said dielectric is not situated underneath a second area of said dielectric (the second area of dielectric is the area where inductor 200 is formed) and not situated over said second area of said dielectric.

AAPA teaches in figure 1 and related text a first area of dielectric 102 comprising silicon oxide and having a first permeability, surrounding the inductor, wherein a first area of said dielectric, a second area of said dielectric, and said conductor appear to have a same thickness.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the first area of said dielectric, said second area of said dielectric, and said conductor of the same thickness, and to use a conductor selected from the group consisting of copper, aluminum and copper-aluminum alloy, and to

surround the inductor of El-Sharawy et al. with a first area of low-k dielectric comprising silicon oxide and having a first permeability, wherein said first area of said dielectric is not situated underneath said second area of said dielectric and not situated over said second area of said dielectric, as taught by Forbes et al. and AAPA, in order to adjust the inductance of the inductor, in order to reduce the contact resistance between the conductor layers with a conventional conducting material, to provide better protection to the inductor by using conventional isolating material, and to use the inductor in a practical application by connecting the inductor to external devices, respectively. Note that substitution of materials is not patentable even when the substitution is new and useful. Safetran Systems Corp. v. Federal Sign & Signal Corp. (DC NIII, 1981) 215 USPQ 979.

Although prior art does not state that the second permeability of magnetic oxide layer 32 is higher than that of the first permeability of the first area of dielectric, this feature is inherent in prior art's device, because it is well known in the art that the permeability of magnetic oxide is higher than that of the silicon oxide.

Regarding the processing limitations recited in claims 24, 37-38 and 44 ("the permeability conversion material is interspersed in the second dielectric area by ion implantation and by sputtering when the first dielectric area is covered with photo resist"), these would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177

USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Regarding claims 31 and 37, El-Sharawy et al. teach an inductor, because section 36 is the center of the inductor (coil), and since layer 38 is located within section 36, then layer 38 is also part of the inductor.

Regarding claims 30, 36 and 47 El-Sharawy et al. do not teach a conductor patterned as a square spiral. AAPA teaches in figure 1 a conductor patterned as a square spiral. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a conductor patterned as a square spiral in El-Sharawy et al.'s device in order to simplify the processing steps of making the device by using conventional square spiral inductor.

Claims 31-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokogawa (Jp 402262308A) in view of Cornett et al. (6,069,397) and Ewen et al. (5,446,311).

Regarding claims 31-34 and 36, Yokogawa teaches in figure 2 and related text a structure in a semiconductor chip, the structure comprising a first area of dielectric 4 (the first area of dielectric 4 is selected to be the area located above the white dielectric layer in the center of the structure, wherein two inductors 3 are located on both sides of the first area) having a first permeability, a second area of dielectric (the white dielectric area located in between inductor 3) having a second permeability, an inductor 3 comprising a square spiral (see figure 1) conductor patterned within the dielectric, patterned in the second area of the dielectric, wherein the material of the second area of the dielectric not being situated underneath the conductor, the first area of the dielectric not being situated underneath and not being situated over the conductor and the second area of the dielectric not being situated over the conductor, and wherein the conductor having first and second terminals, the first and second terminals of the conductor being respectively first and second terminals of the inductor, wherein said conductor comprises a plurality of metal turns, wherein said plurality of metal turns are not situated underneath said dielectric and not situated above said dielectric.
Yokogawa does not teach the material of the first area of dielectric 4 and the material of the second area of dielectric, wherein first area of said dielectric, said second area of said dielectric, and said conductor have a same thickness.
Cornett et al. teach in figure 2 and related text a structure in a semiconductor chip, the structure comprising a dielectric 217 having a first permeability, a permeability conversion magnetic oxide material 223 having a second permeability, the permeability conversion material (metal) being interspersed within the dielectric, wherein the second

permeability is greater than the first permeability (column 2, lines 39-62), wherein a second permeability being achieved by interspersing a permeability conversion material (metal particles) within the second area of the dielectric, the permeability conversion material having a third permeability, the third permeability being greater than the first and second permeabilities, an inductor 110 comprising a square spiral (see figure 1) conductor patterned within the dielectric, wherein the permeability conversion material 223 not being situated underneath the conductor, the conductor having first and second terminals, the first and second terminals of the conductor being respectively first and second terminals of the inductor.

Cornett et al. do not explicitly state that the second permeability of magnetic oxide layers 221, 223 is greater than the first permeability of passivation/dielectric layer 217. That is, Cornett et al. do not state that the conventional passivation/dielectric layer 217 comprise silicon oxide. Ewen et al. teach in figure 3 a passivation/dielectric layer 2 comprising silicon oxide.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the first area of said dielectric, said second area of said dielectric, and said conductor of the same thickness, and to use silicon oxide as the material for the first area of dielectric 4 and magnetic oxide as the material of the second area of dielectric (the white area between inductor 4) in Yokogawa's device, as taught by Cornett et al., in order to adjust the inductance of the inductor, in order to simplify the processing the steps of the making the device by insulating the device with

a conventional silicon oxide insulating material, and in order to improve the magnetic characteristics of the inductor, respectively.

Regarding claim 35, Yokogawa does not teach using a conductor being selected from the group consisting of copper, aluminum, and copper-aluminum alloy. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a conductor being selected from the group consisting of copper, aluminum, and copper-aluminum alloy in Yokogawa 's device in order to improve the conductivity of the device with a conventional conducting material. Note that substitution of materials is not patentable even when the substitution is new and useful. Safetran Systems Corp. v. Federal Sign & Signal Corp. (DC NIII, 1981) 215 USPQ 979.

Response to Arguments

Applicant argues that prior art does not teach the claimed limitations of said first area of said dielectric, said second area of said dielectric, and said conductor have a same thickness, as recited in claims 24, 31 and 37.

There is no support in the specification for the claimed limitations of said first area of said dielectric, said second area of said dielectric, and said conductor have a same thickness, as recited in claims 24, 31 and 37. In any event, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to form

the first area of said dielectric, said second area of said dielectric, and said conductor of the same thickness in prior art's device, in order to adjust the inductance of the inductor.

The rest of applicant's arguments were adequately addressed in previous office action.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

O.N.
4/21/06

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